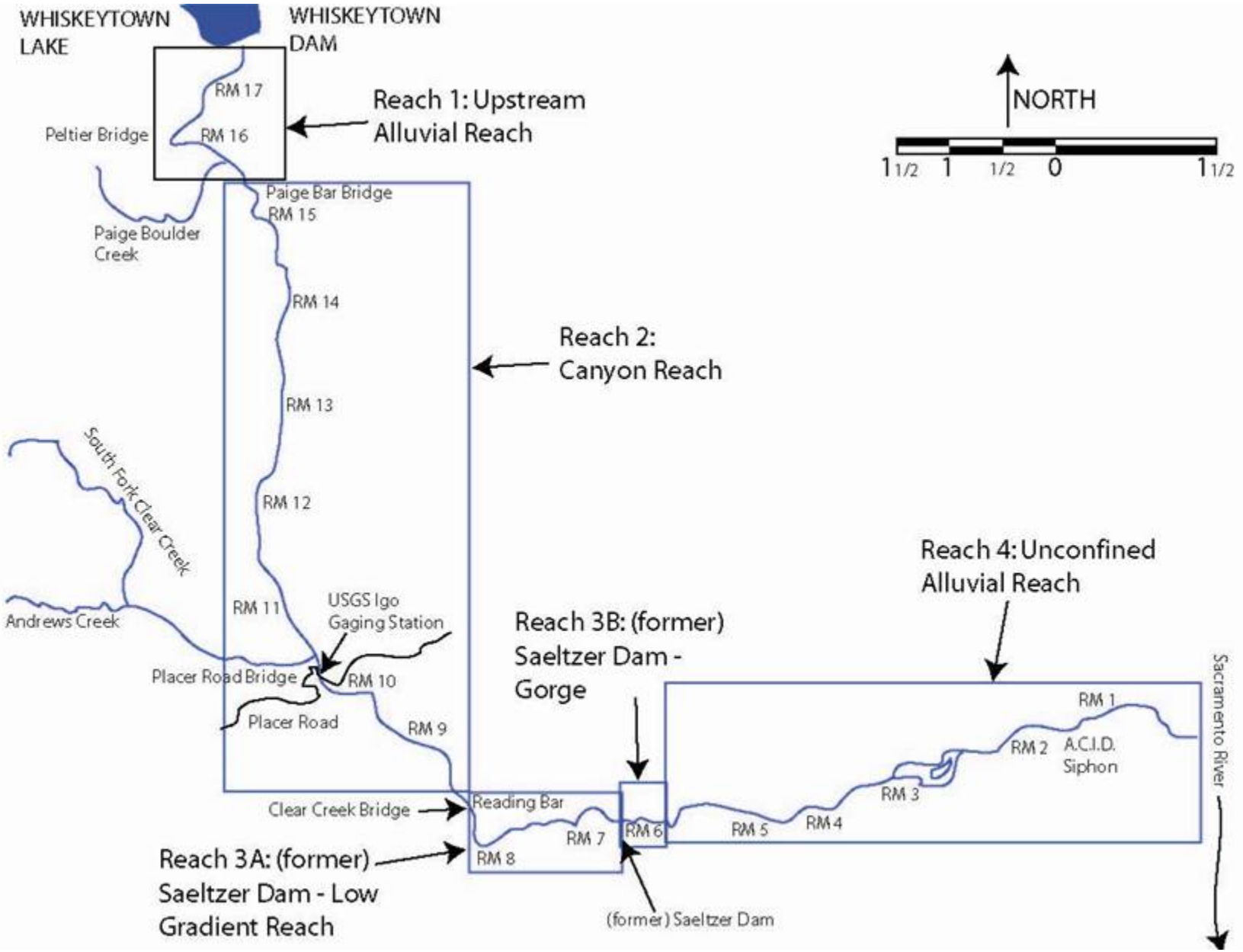

Figure 1. Lower Clear Creek reach delineations. Modified from McBain and Trush 2001.

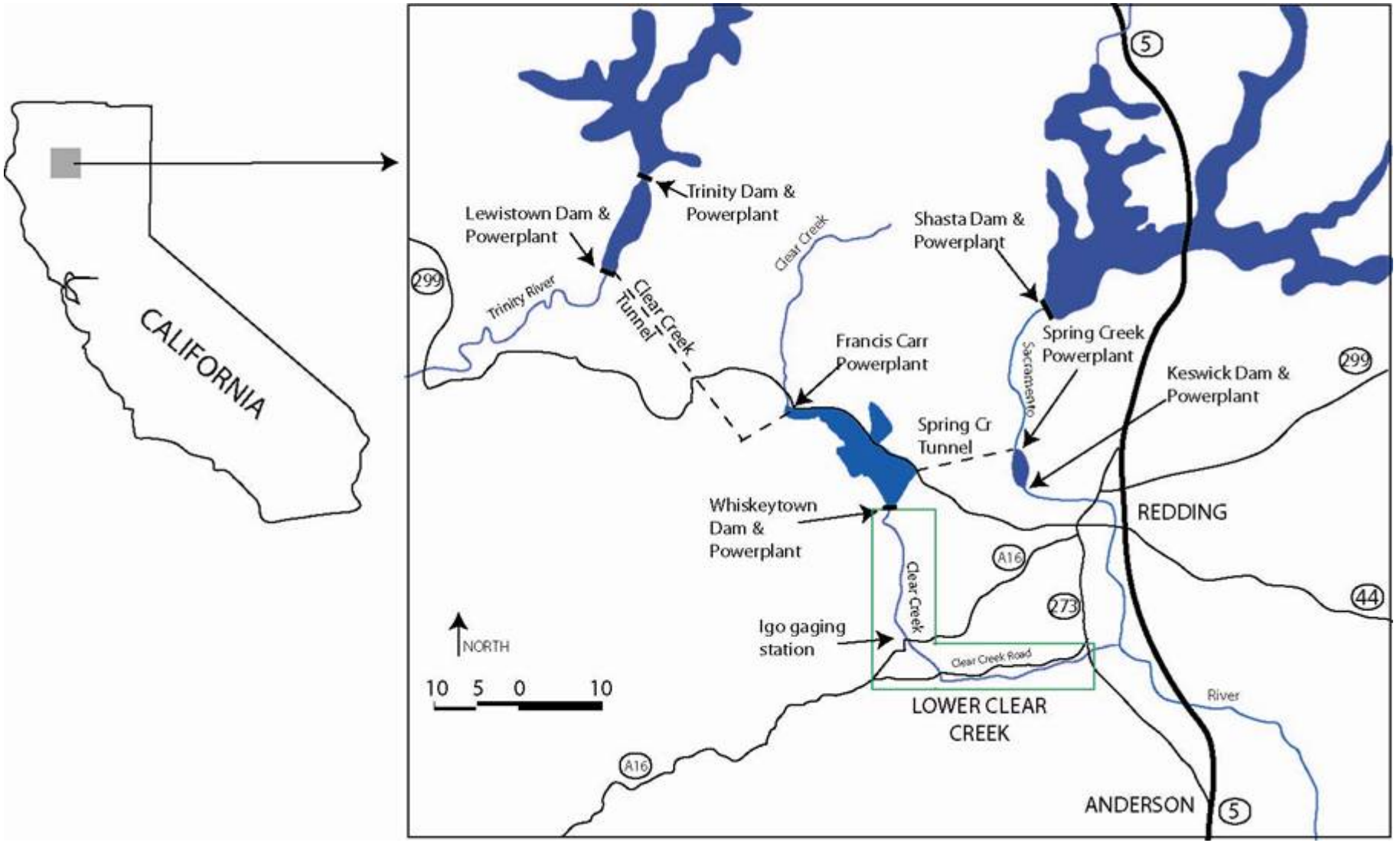

Figure 2. Lower Clear Creek watershed location map. Modified from McBain and Trush 2001.

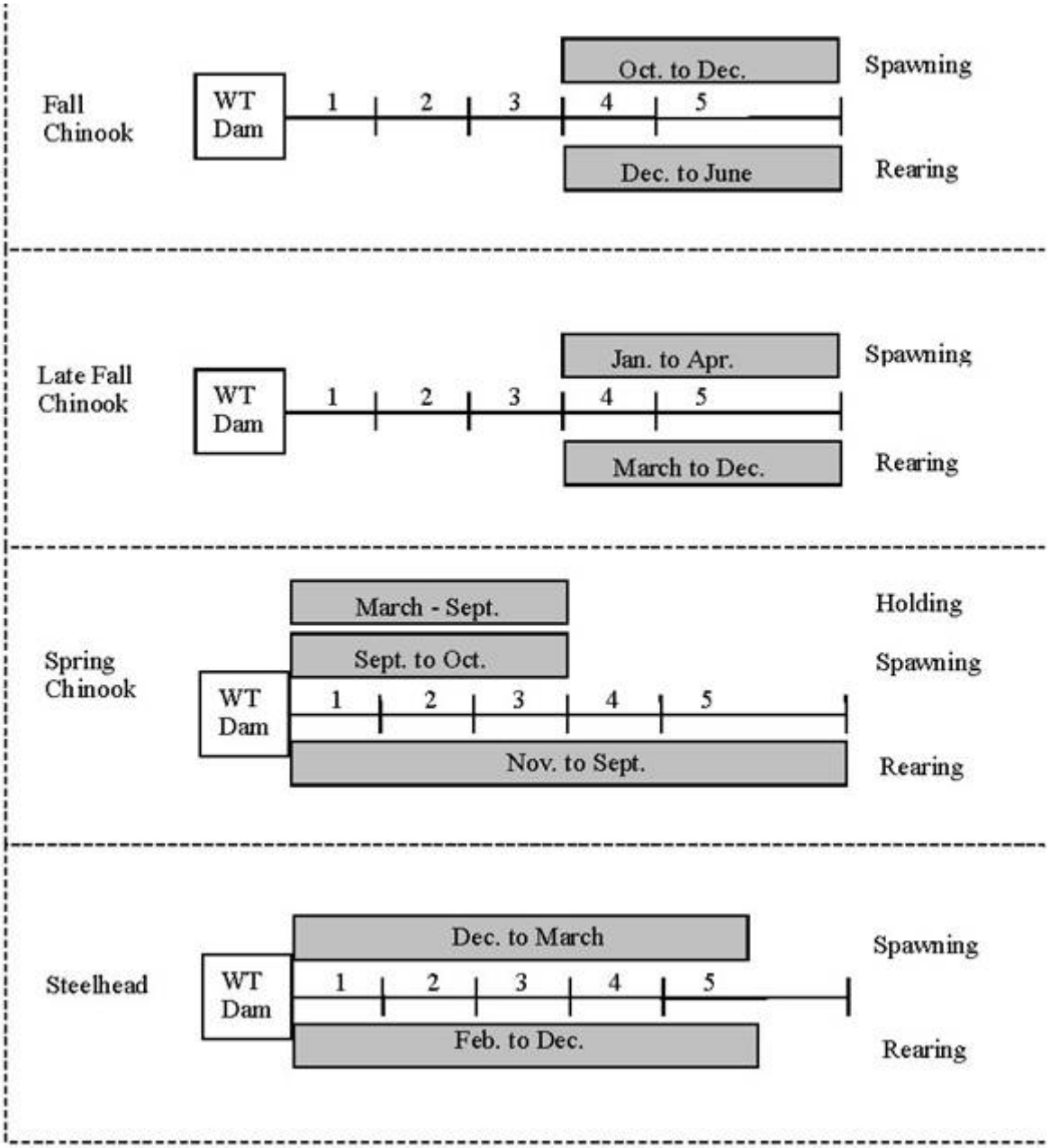

Figure 3. Temporal and spatial characteristics of anadromous fish populations in Clear Creek (from Alexander et al. 2003, p. 82).

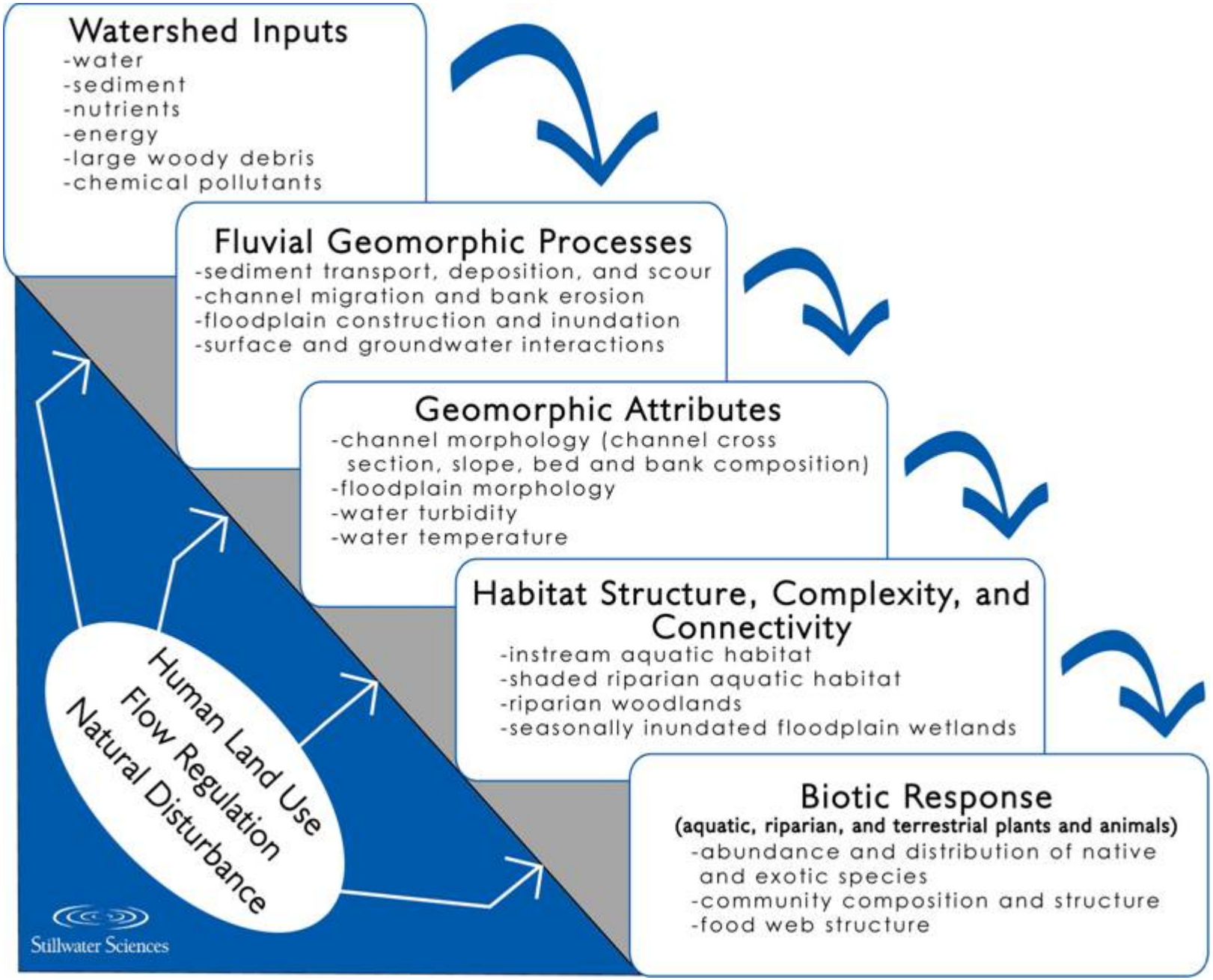

Figure 4. Hierarchy of processes resulting from watershed disturbances.

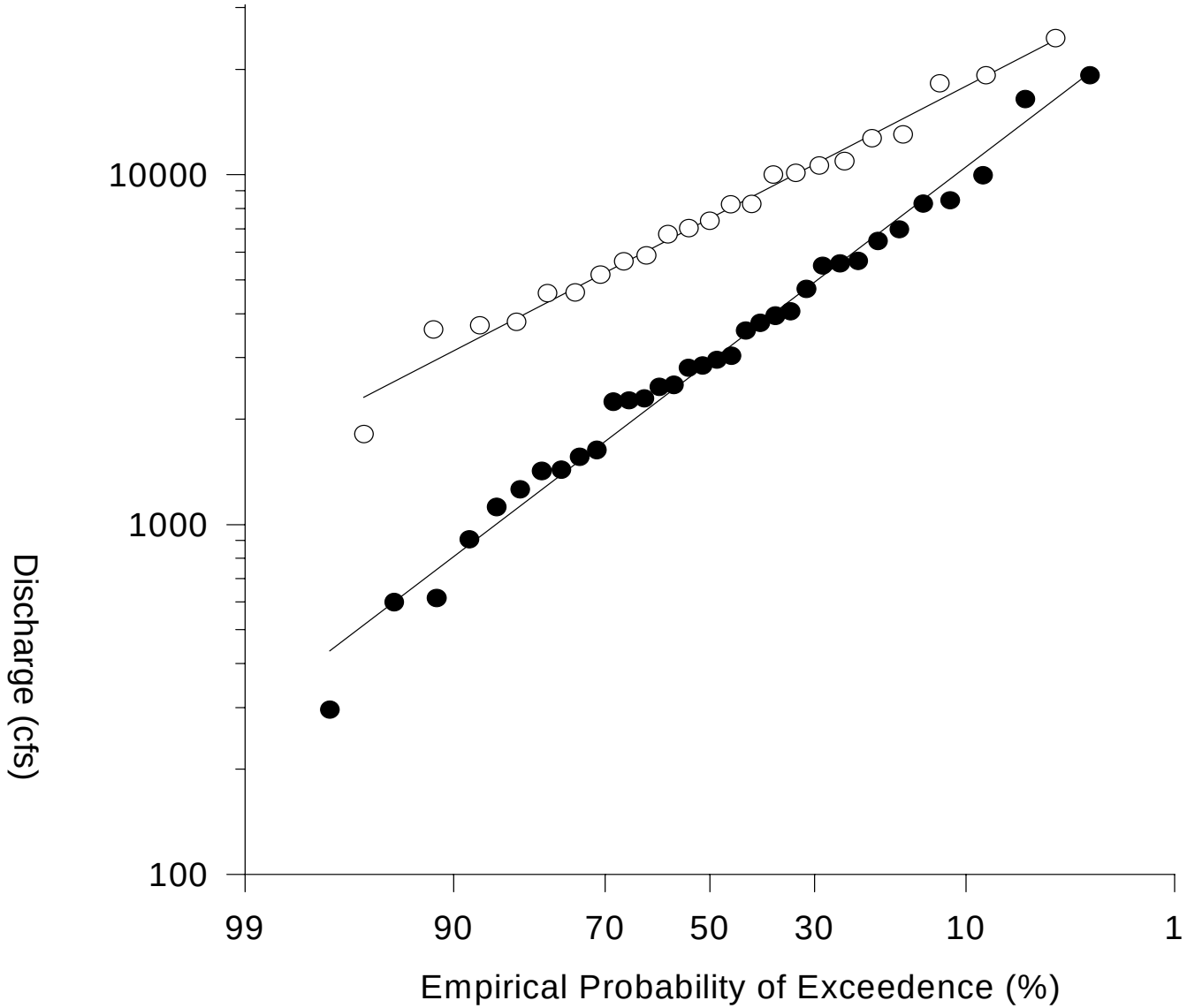

Figure 5. Empirical flood frequency curves for peak flows in lower Clear Creek before (open symbols) and after (closed symbols) construction of Whiskeytown Dam. "Ordinary" peak flows have been affected more than extreme flows. (Source: Williams and Kondolf 1999).

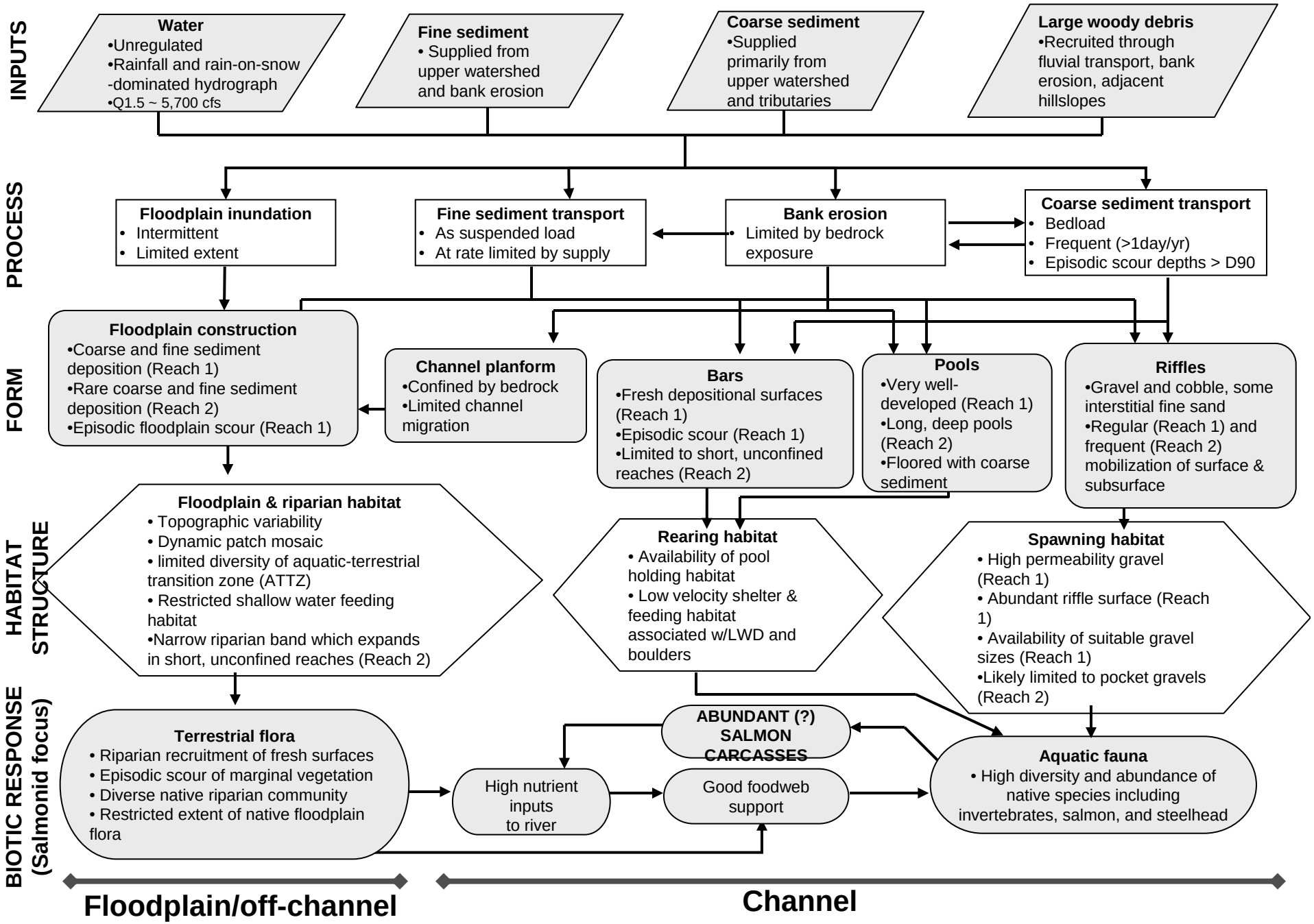

Figure 6a. Conceptual model of reference condition processes and linkages in Reaches 1 and 2: unregulated bedrock-confined gravel bed river.

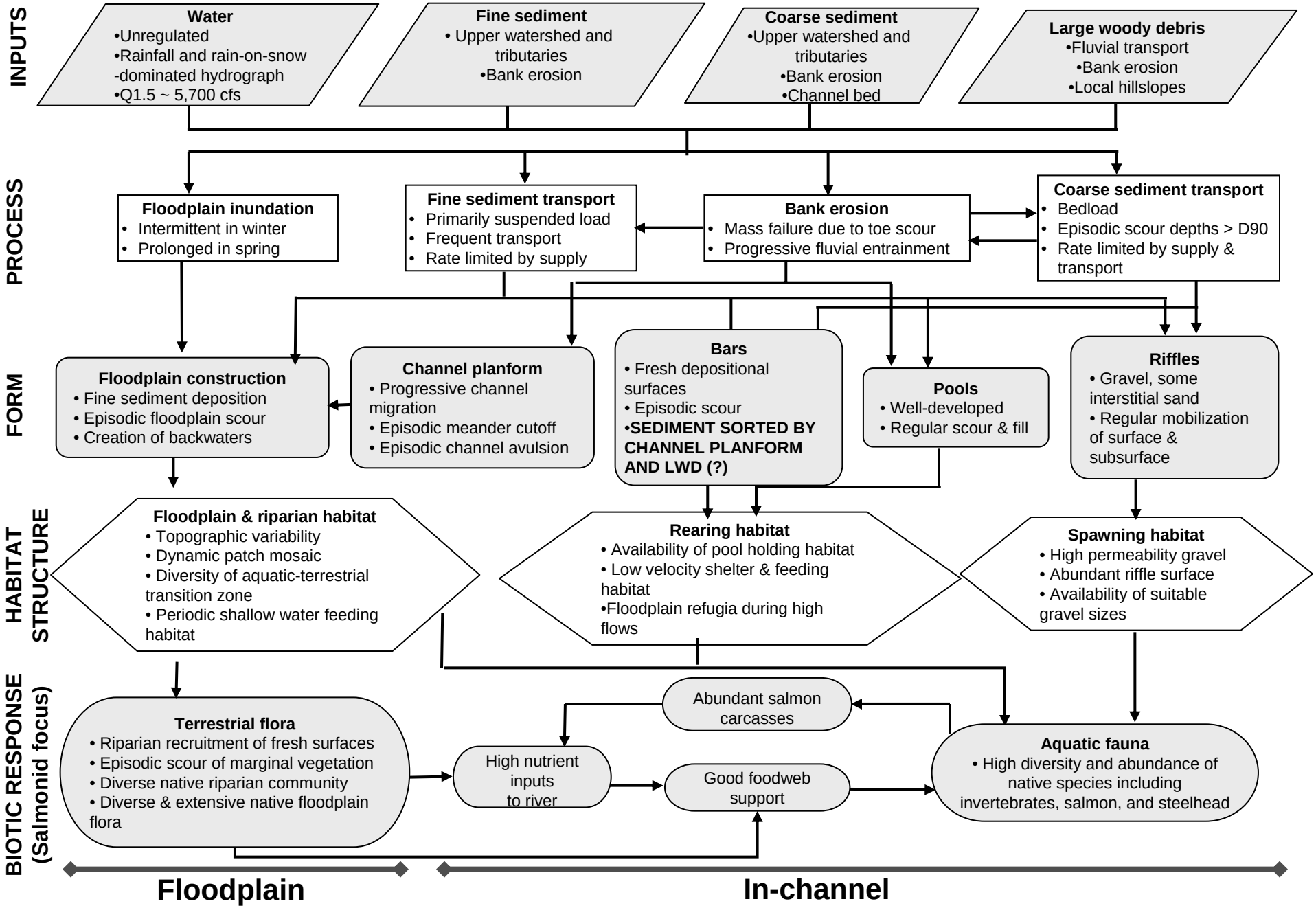

Figure 6b: Conceptual model of reference condition processes and linkages in Reaches 3 and 4: unregulated, unconfined gravel bed river.

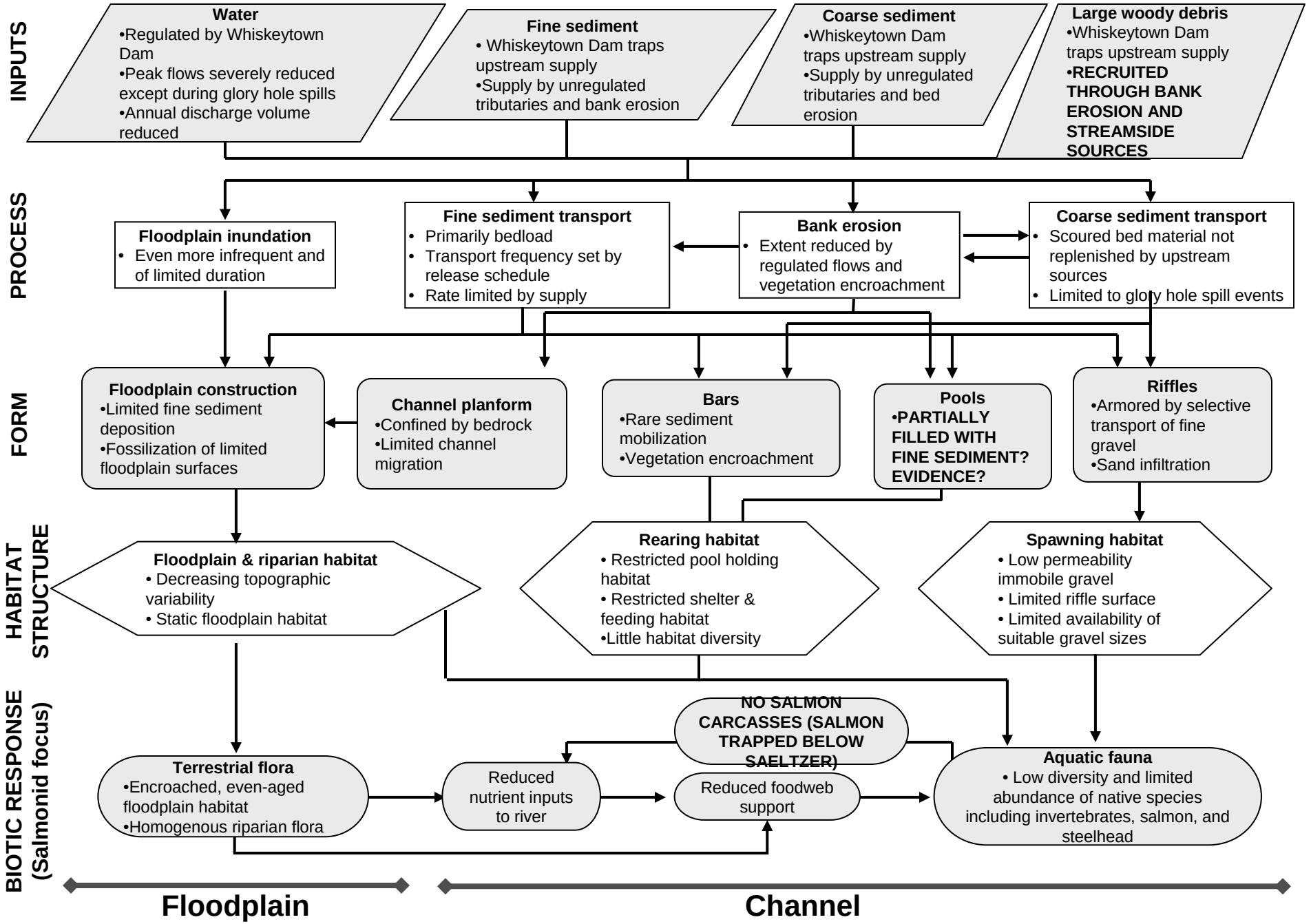

Figure 7a: Conceptual model of processes and linkages for a gravel bed (confined) river, Reach 1, Lower Clear Creek, CONDITIONS PRIOR TO RESTORATION.

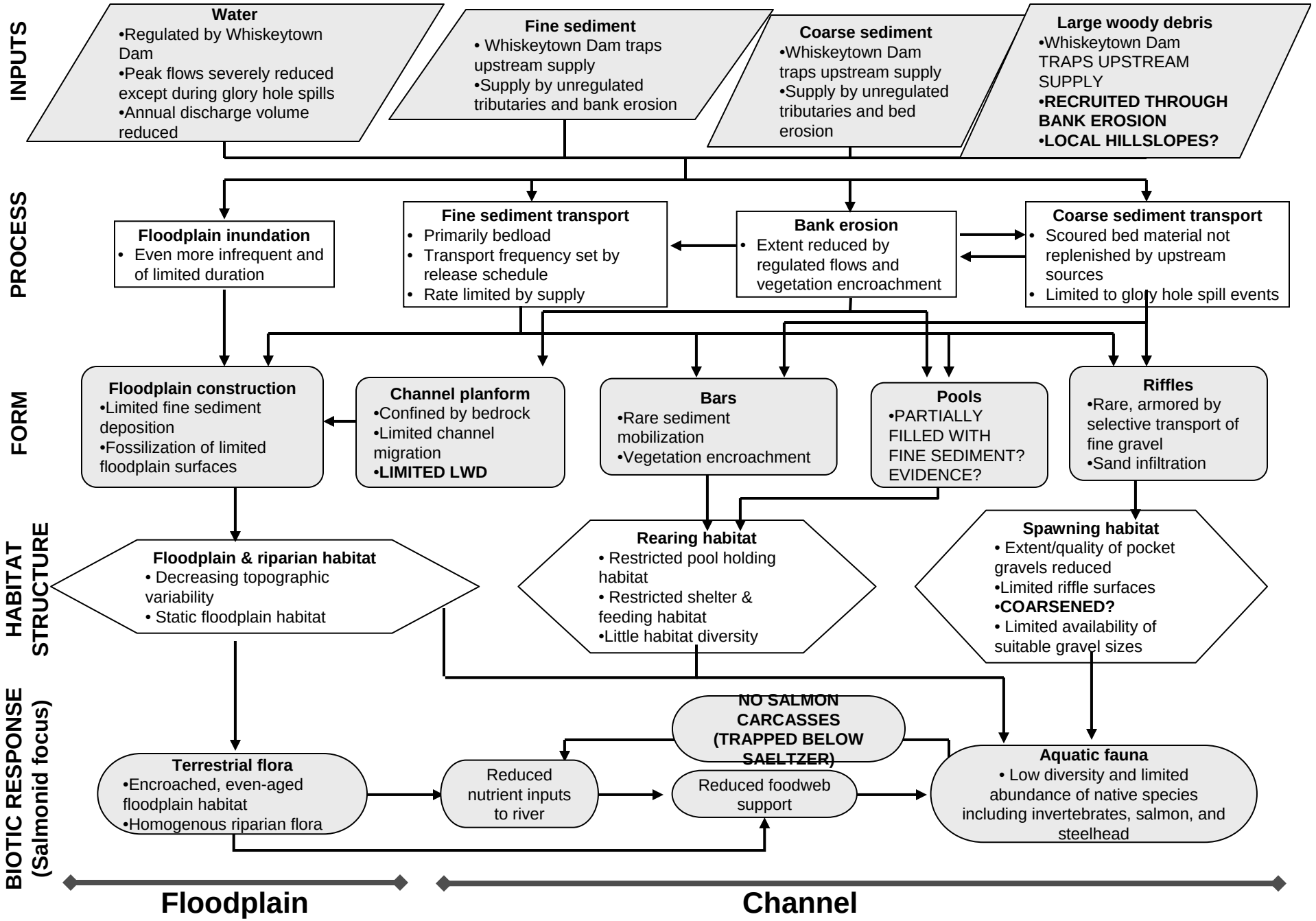

Figure 7b: Conceptual model of processes and linkages for a gravel bed (confined) river, Reach 2, Lower Clear Creek, CONDITIONS PRIOR TO RESTORATION.

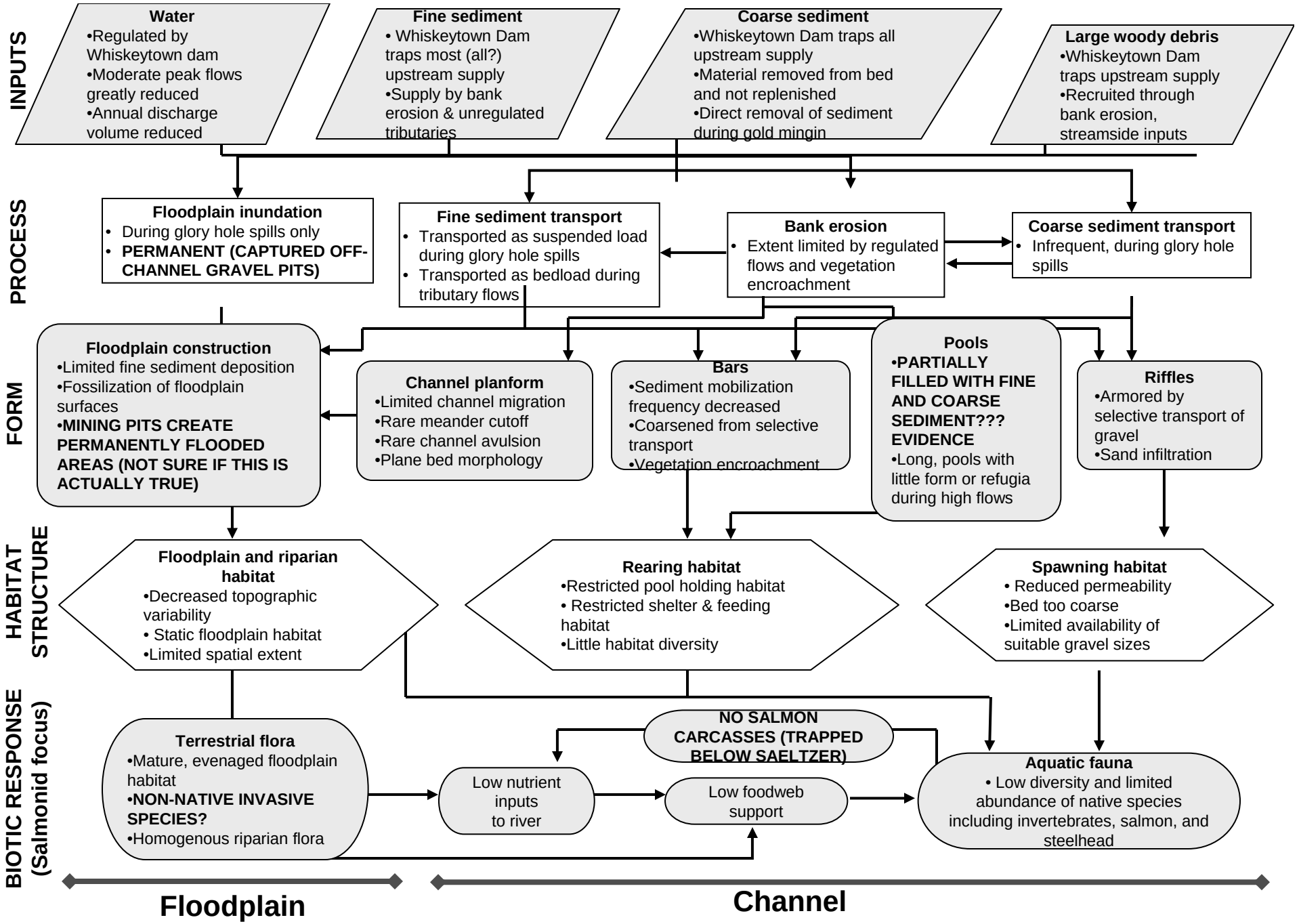

Figure 7c: Conceptual model of processes and linkages for a gravel bed (unconfined) river, Reach 3, Lower Clear Creek, CONDITIONS PRIOR TO RESTORATION.

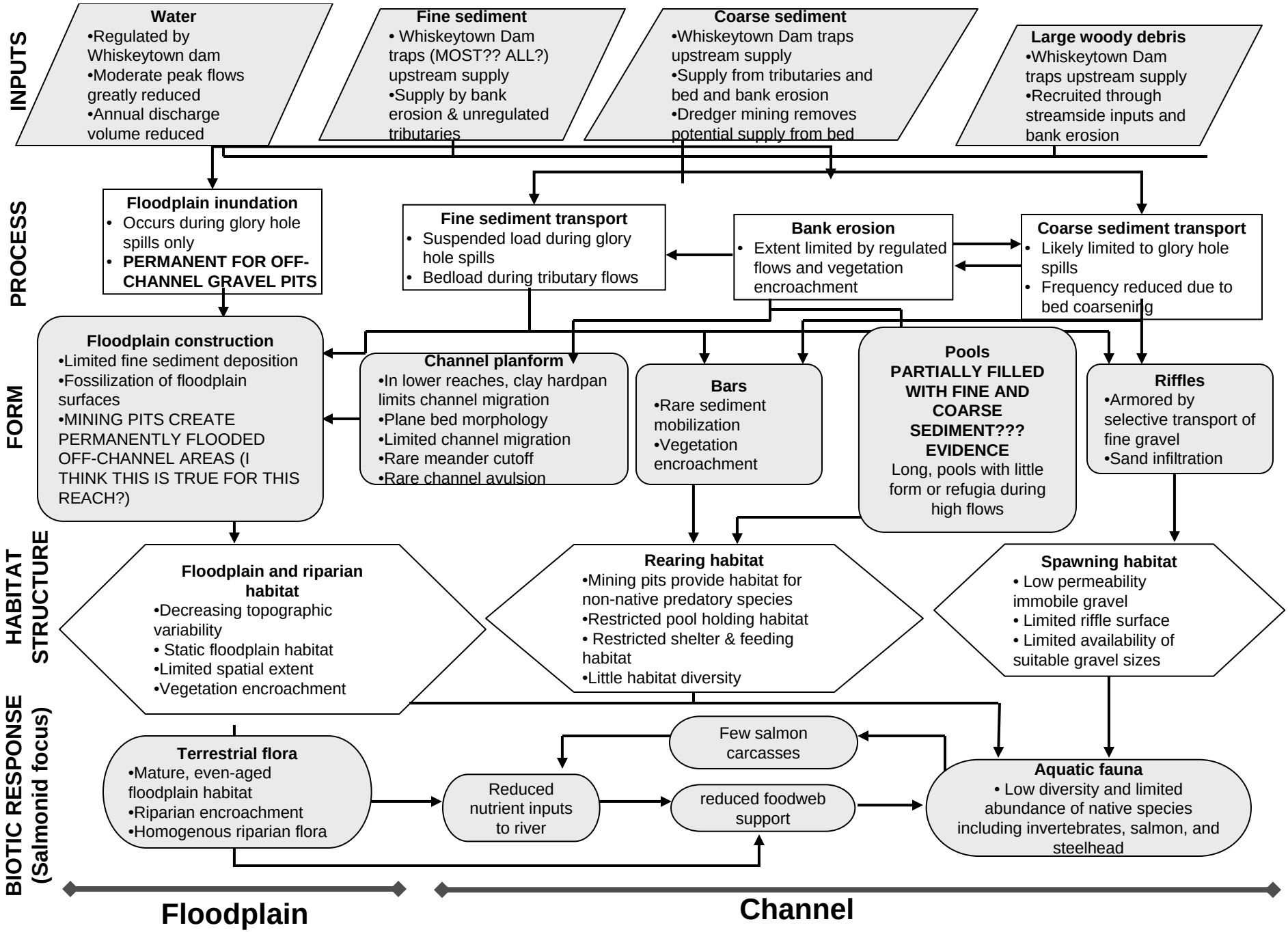

Figure 7d: Conceptual model of processes and linkages for a gravel bed (unconfined) river, Reach 4, Lower Clear Creek, CONDITIONS PRIOR TO RESTORATION.

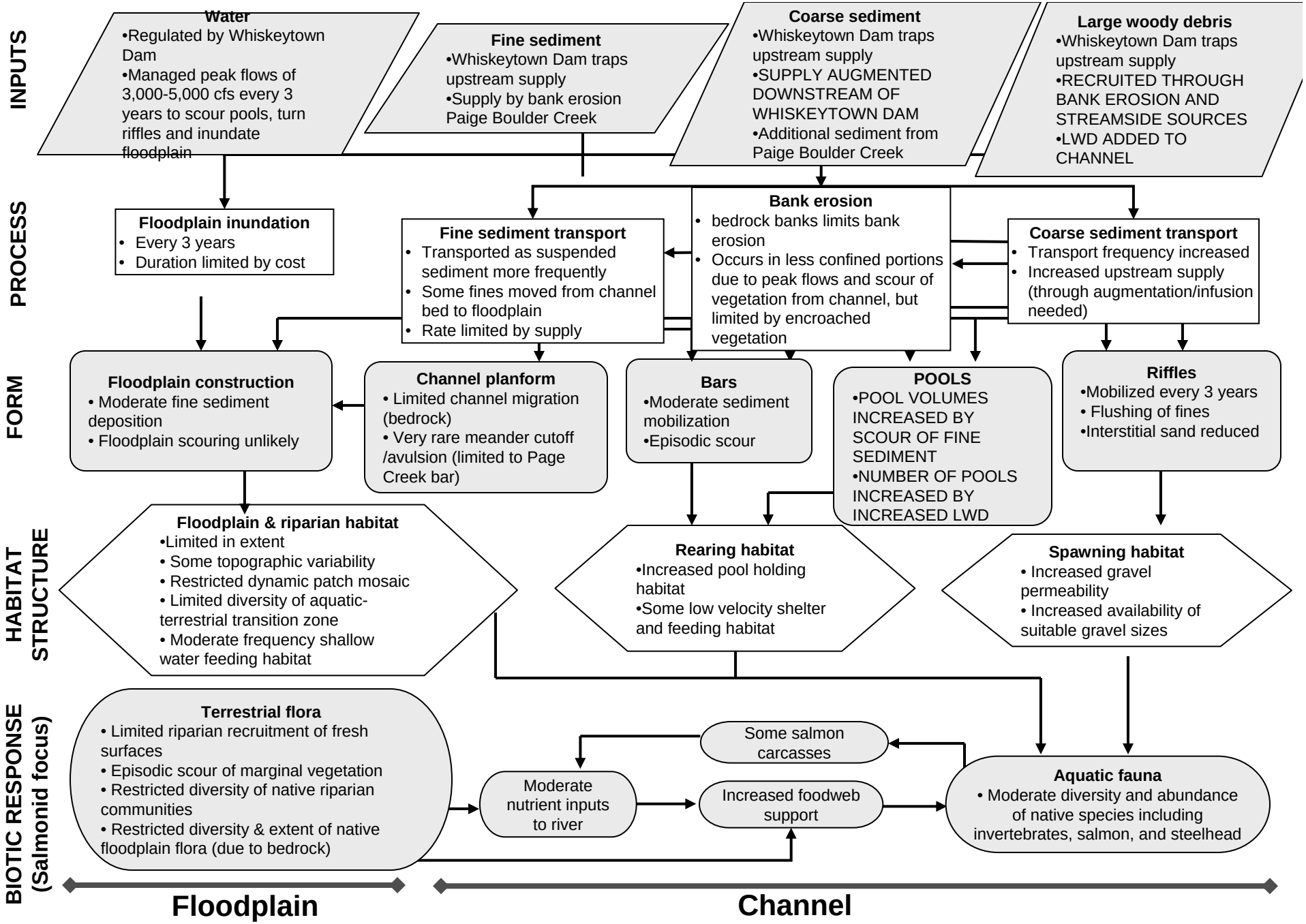

Figure 8a: Conceptual model of processes and linkages for a gravel bed (confined) river, Reach 1, Lower Clear Creek, CONDITIONS FOLLOWING RESTORATION.

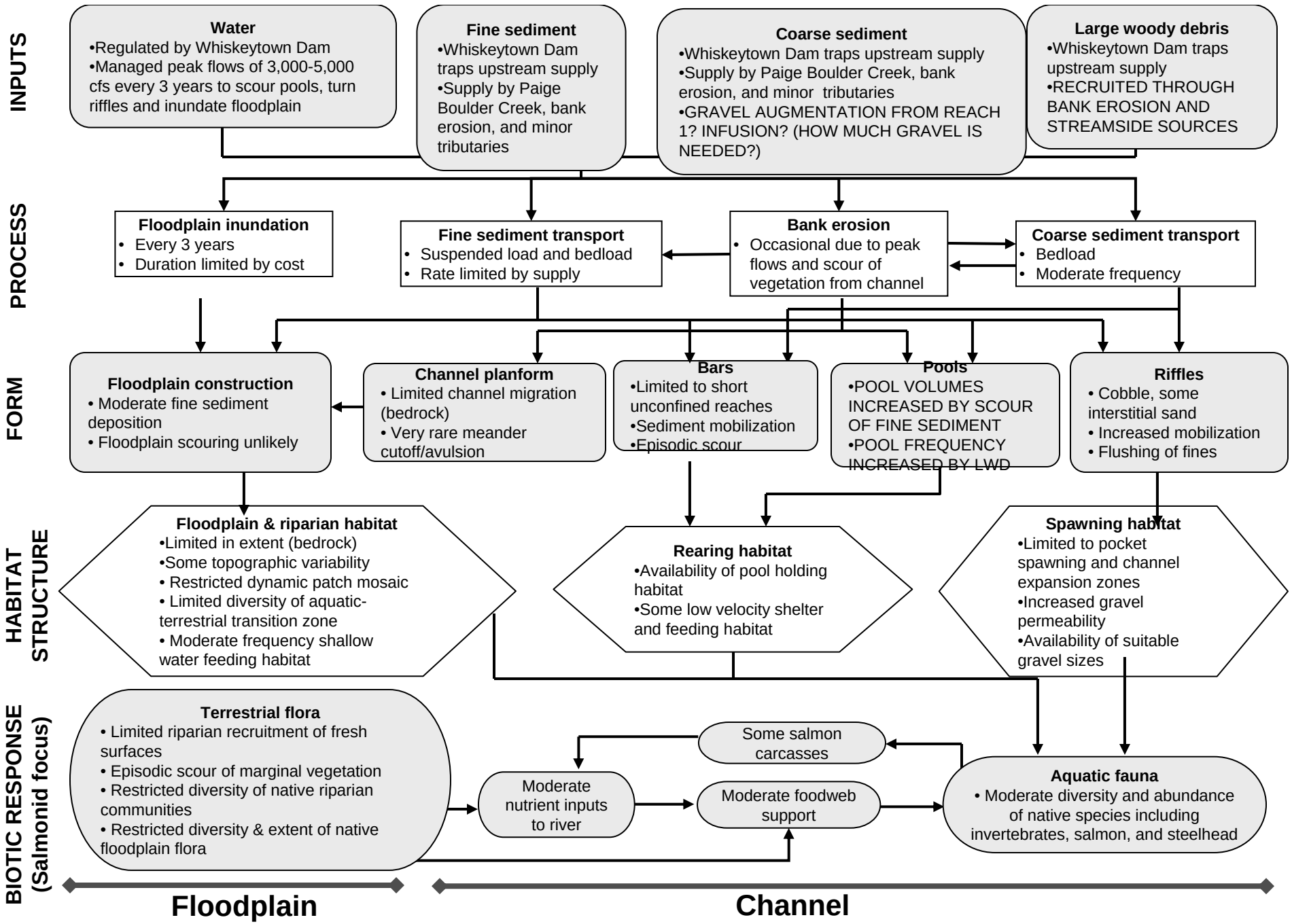

Figure 8b: Conceptual model of processes and linkages for a gravel bed (confined) river, Reach 2, Lower Clear Creek, CONDITIONS FOLLOWING RESTORATION.

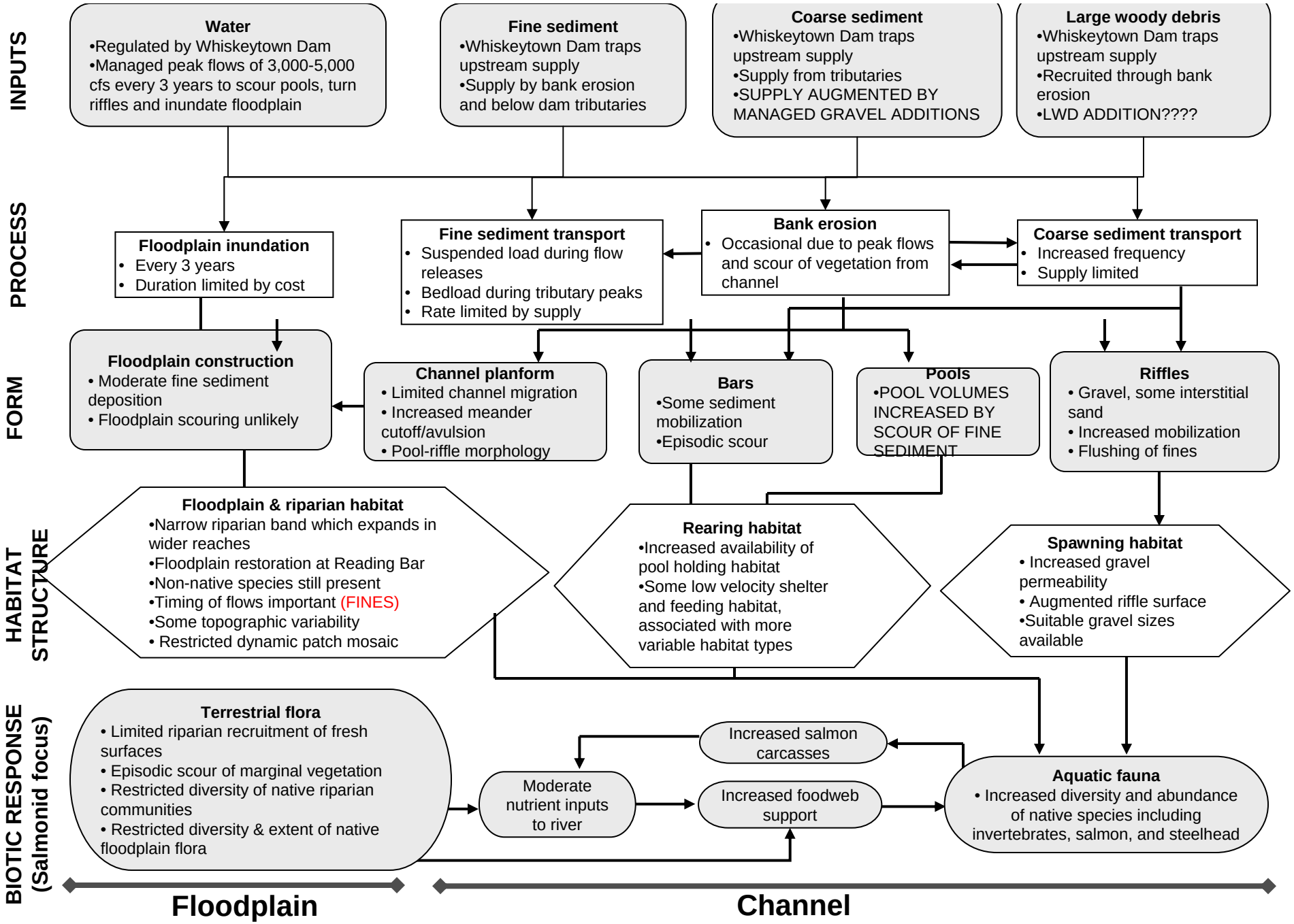

Figure 8c: Conceptual model of processes and linkages for a gravel bed (unconfined) river, Reach 3, Lower Clear Creek, CONDITIONS FOLLOWING RESTORATION.

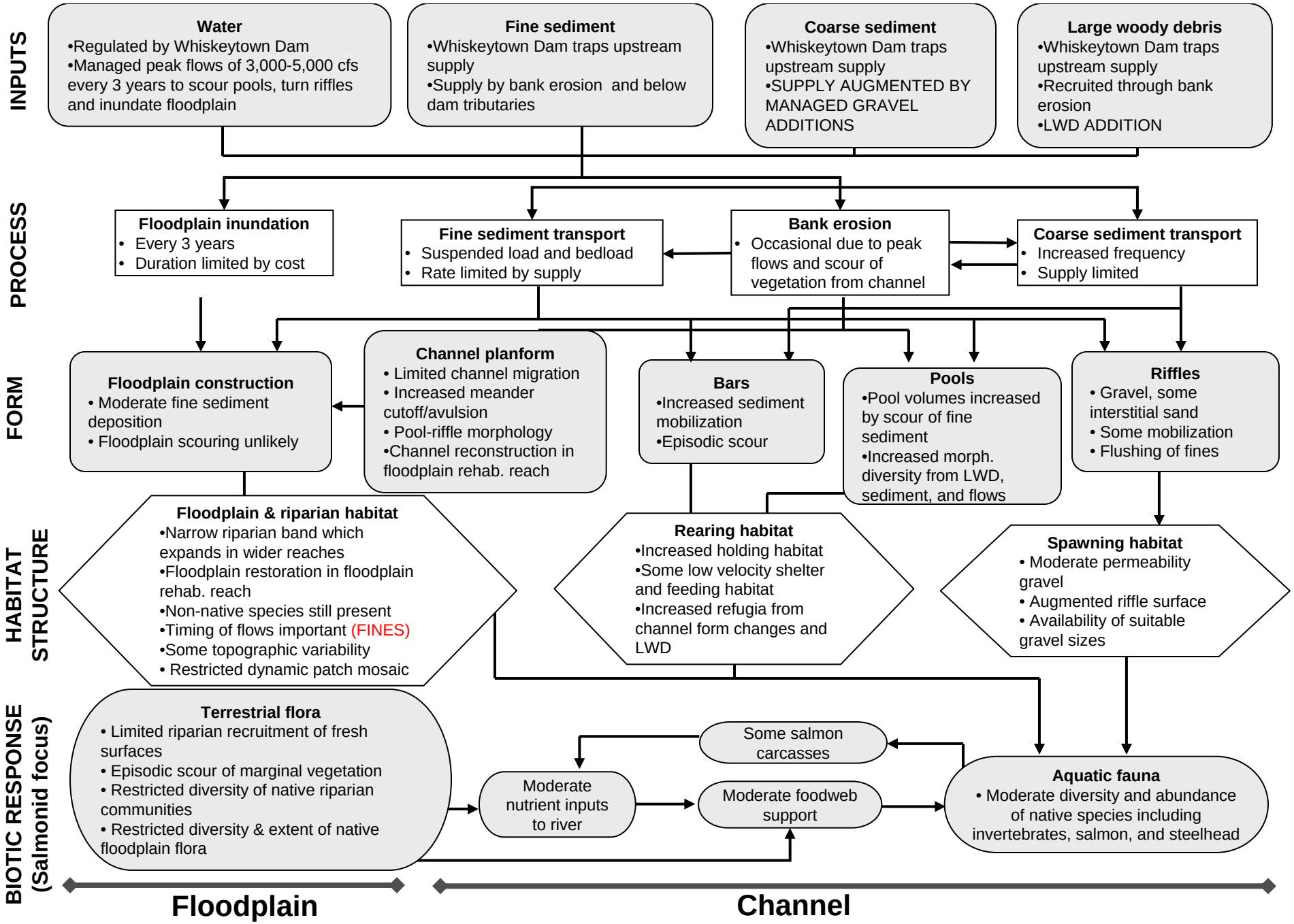

Figure 8d: Conceptual model of processes and linkages for a gravel bed (unconfined) river, Reach 4, Lower Clear Creek, CONDITIONS FOLLOWING RESTORATION.

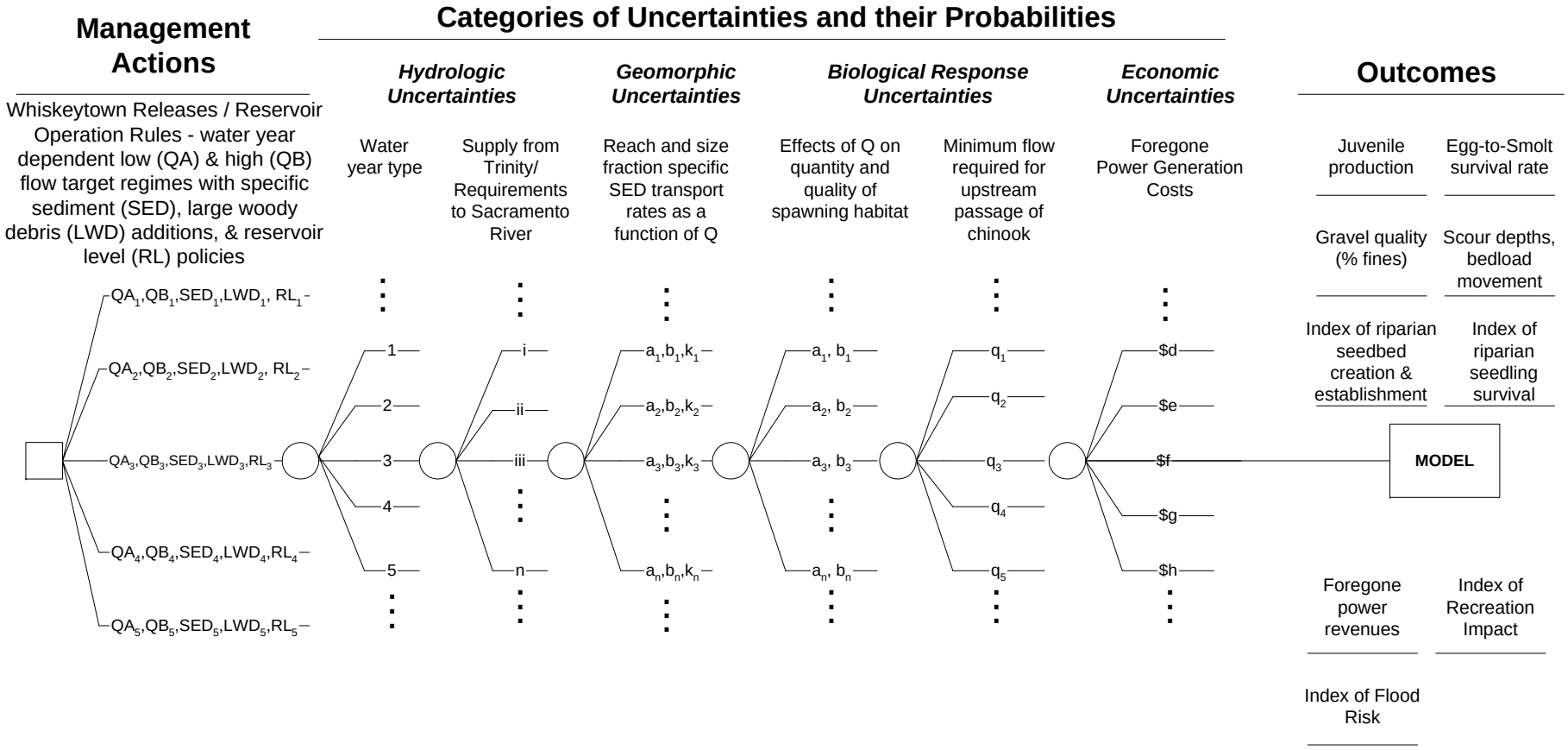

Figure 9: Example "base case" or present uncertainty decision analysis showing example actions, uncertain states of nature, and performance indicators (used to assess achievement of specific objectives) to illustrate the problem of restoring channel processes and salmonid habitat in Clear Creek. "Q" refers to the Clear Creek discharge. (Source: Alexander et al. 2003).

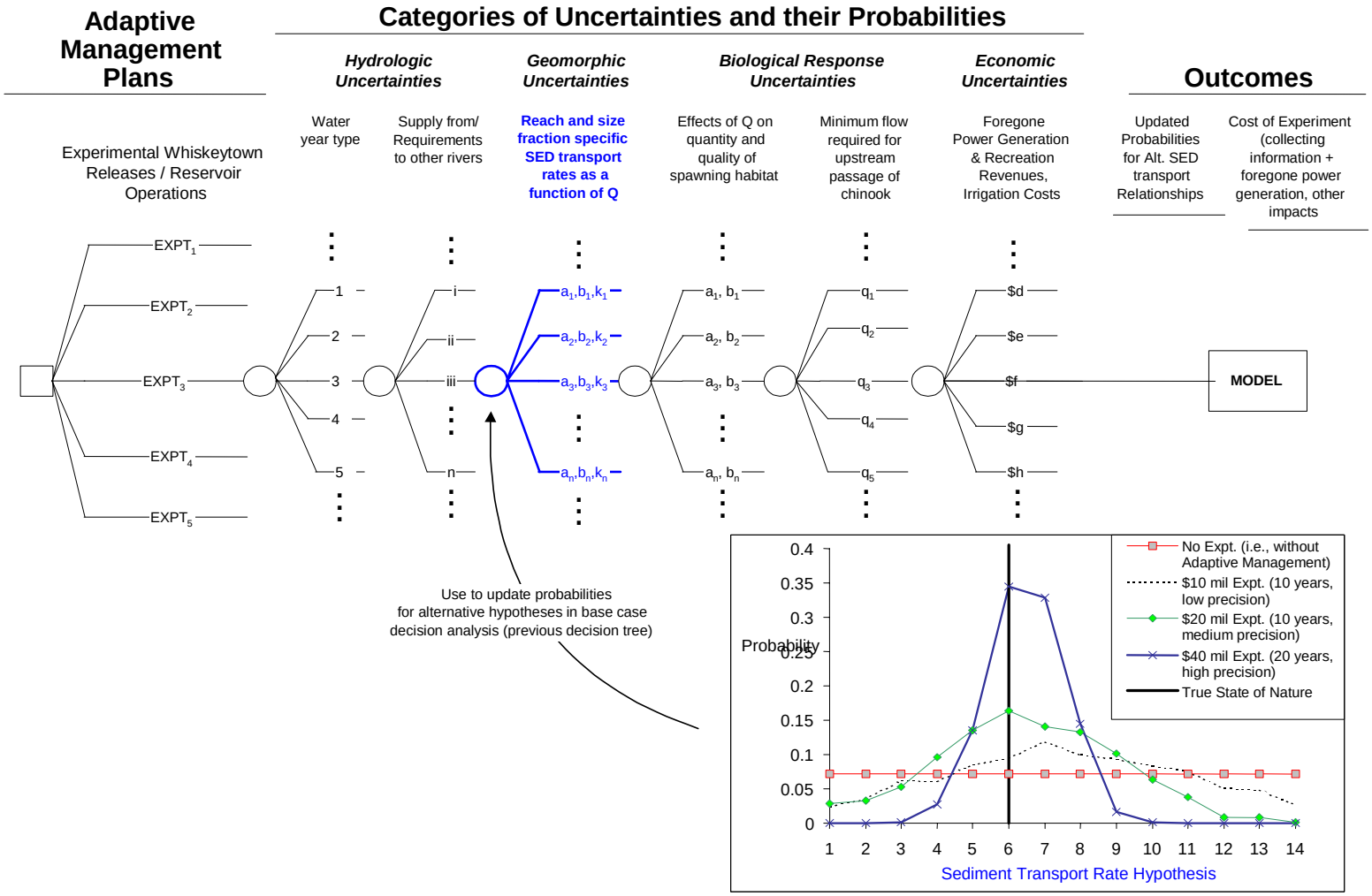

Figure 10: Example decision tree for evaluating the value of information and impact on decisions of doing adaptive management. Actions become alternative flow experiments and survey designs. The key result from adaptive management is the change in probabilities for key uncertainties (in this example sediment transport rates as one example) along with the cost of the experiment. These new probabilities then replace the previous weights used in the present uncertainty decision analysis (Figure 2.5.X). By updating the results of the base case decision analysis with the new probabilities, decision analysis reveals what you would have done with and without the new information. If a different action is chosen and the experiment is of acceptable cost and statistical power–adaptive management is worth it (because the expected outcomes will be more reliable).

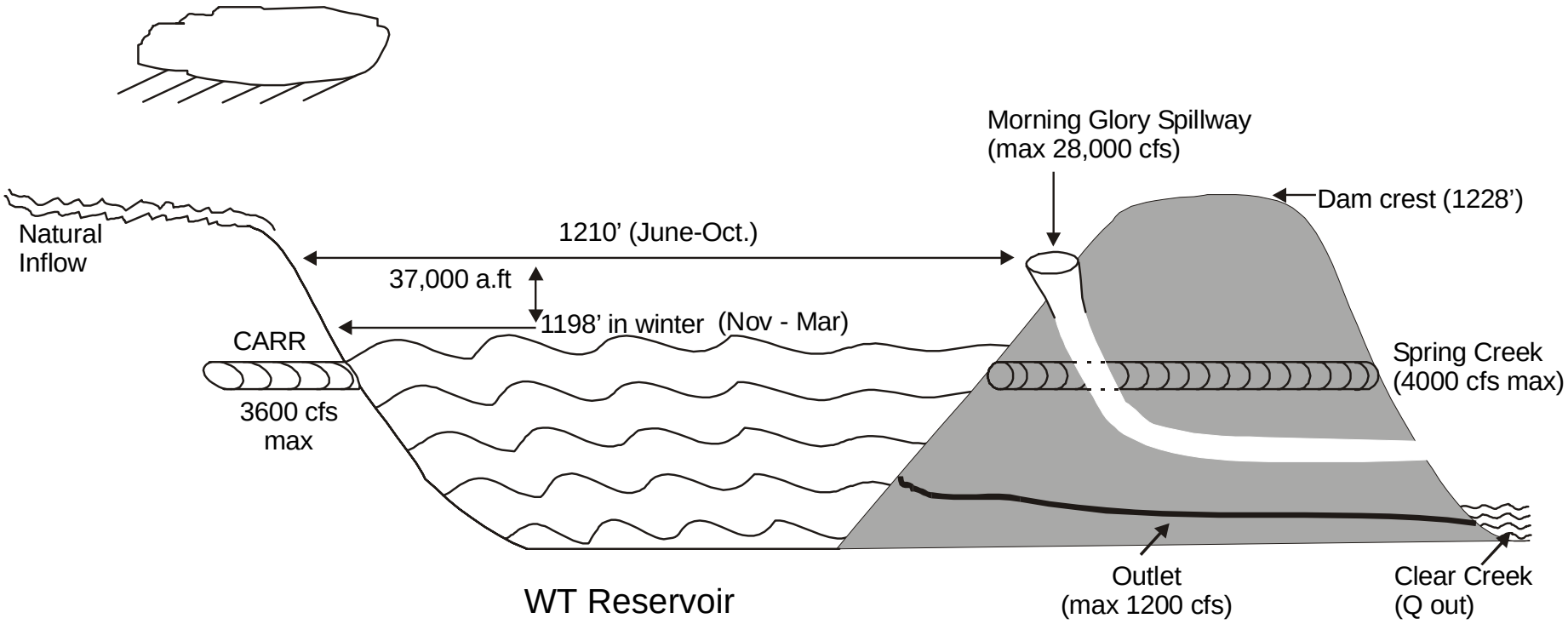

Figure 11: Whiskeytown Dam and Reservoir and its major outlet works. cfs = cubic feet per second. CARR = Judge Francis Carr tunnel and Power Plant. Spring Creek = Spring Creek tunnel and Power Plant. Q = discharge in cfs.

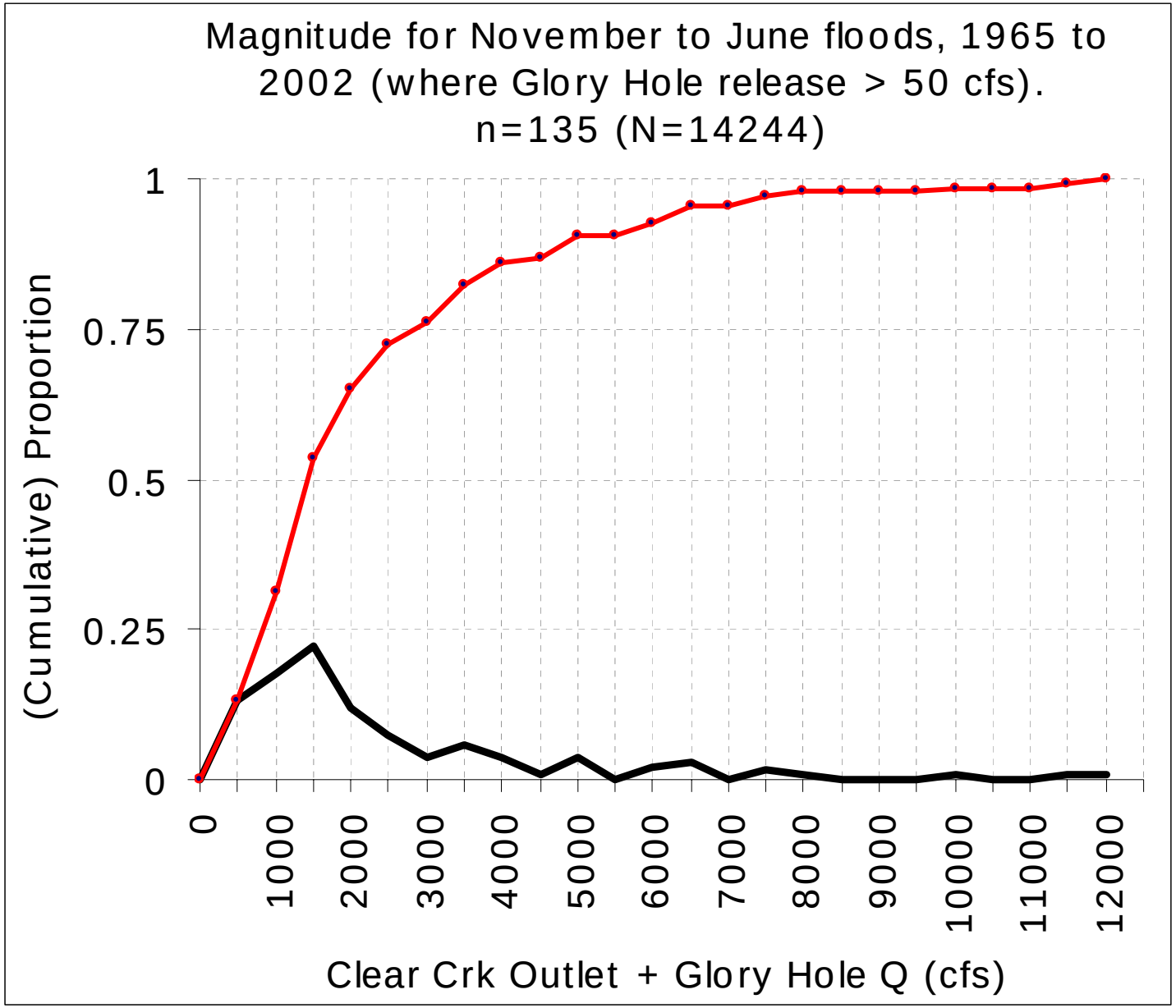

Figure 12: Magnitude of November to June floods, 1965 to 2002 (where Glory Hole release > 50 cfs). n=135 (N=14244). n = number of observations meeting criteria. N = total number of daily observations in the period of record used. Q = discharge in cubic feet per second.

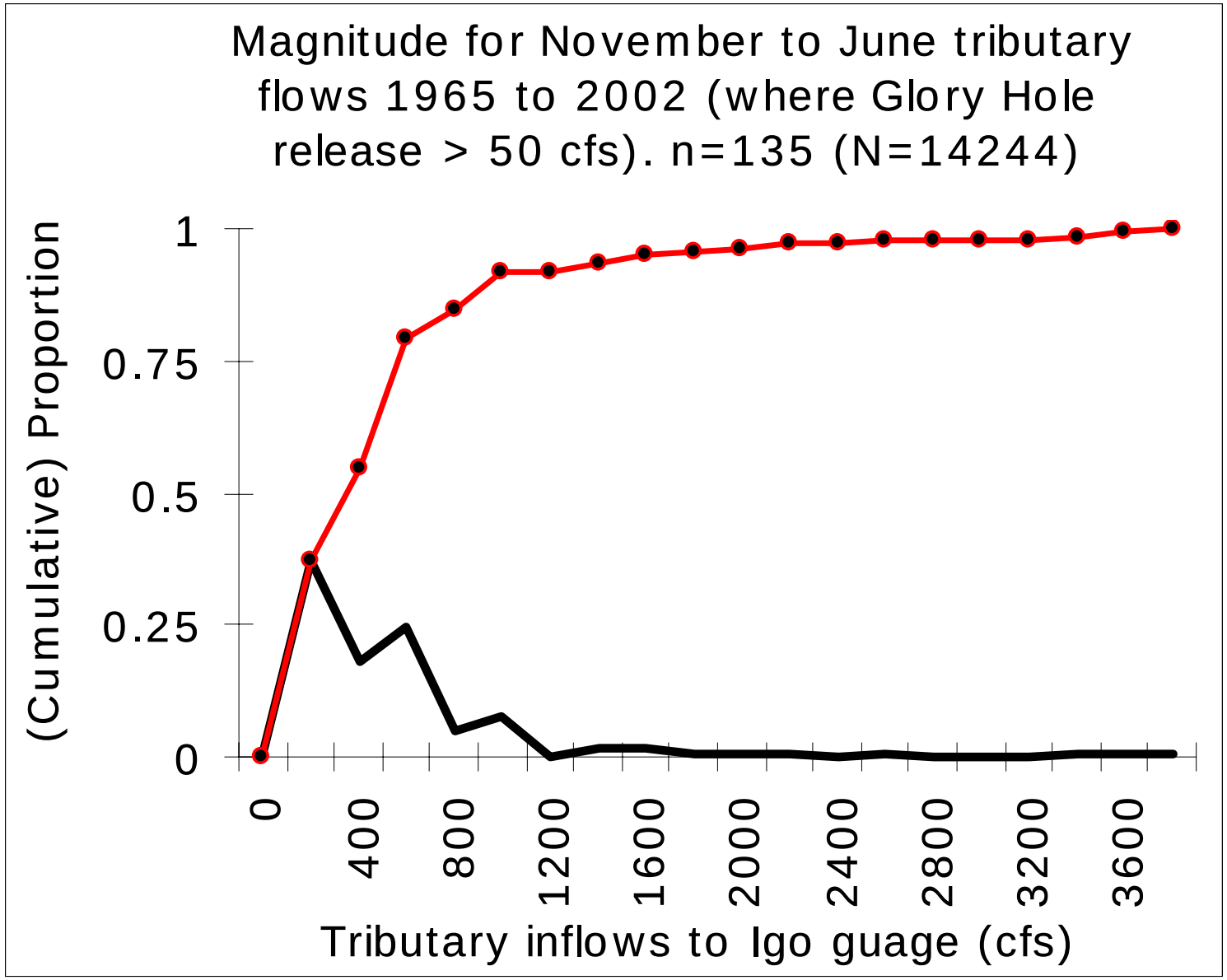

Figure 13: Magnitude of November to June tributary flows, 1965 to 2002, as measured by difference between flow at Igo gage and flows exiting Whiskeytown dam (for cases where Glory Hole release > 50 cfs). n = number of observations meeting criteria. N = total number of daily observations in the period of record used.

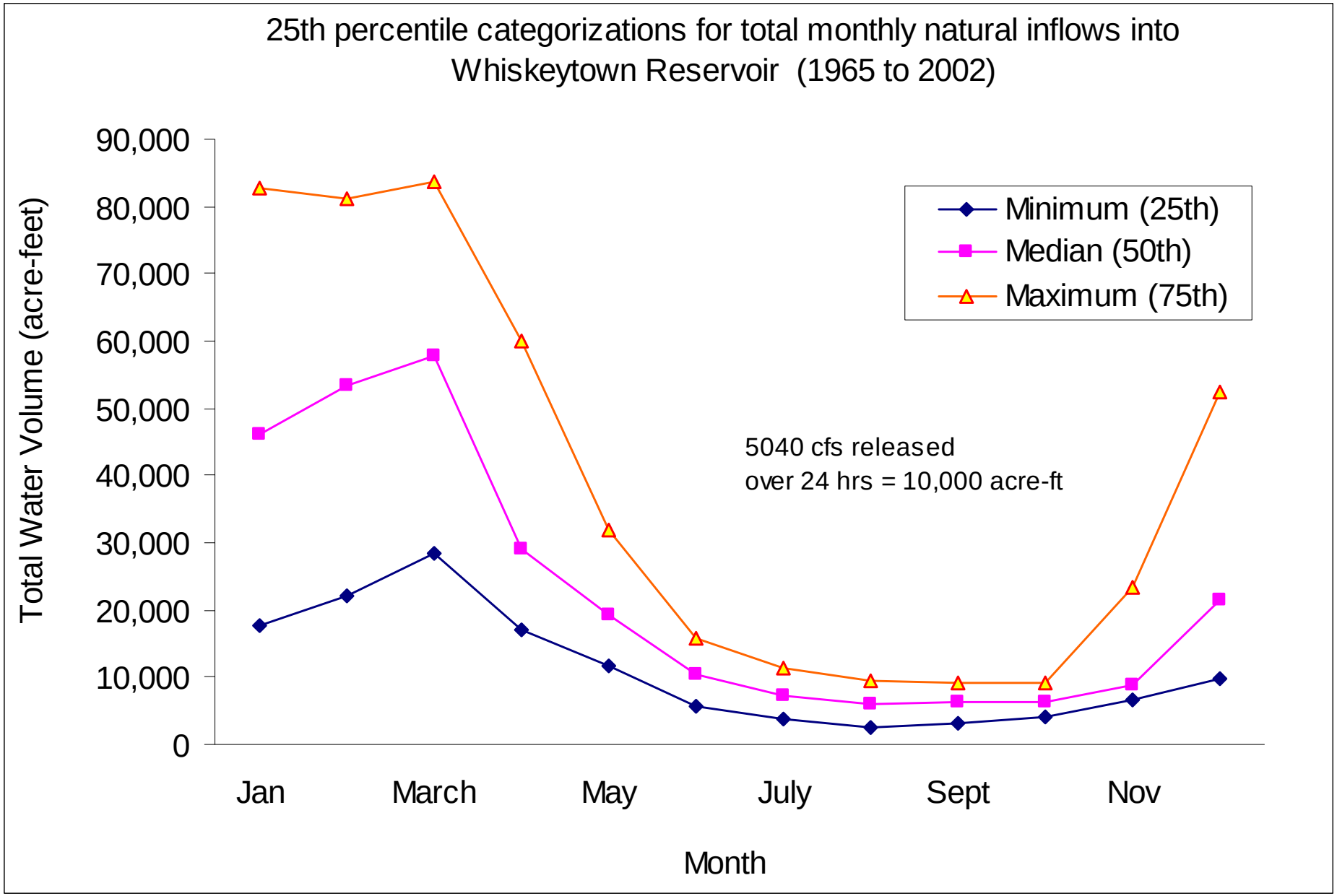

Figure 14a: Quartiles for total natural (outside management control) monthly inflow to Clear Creek, 1965 to 2002.

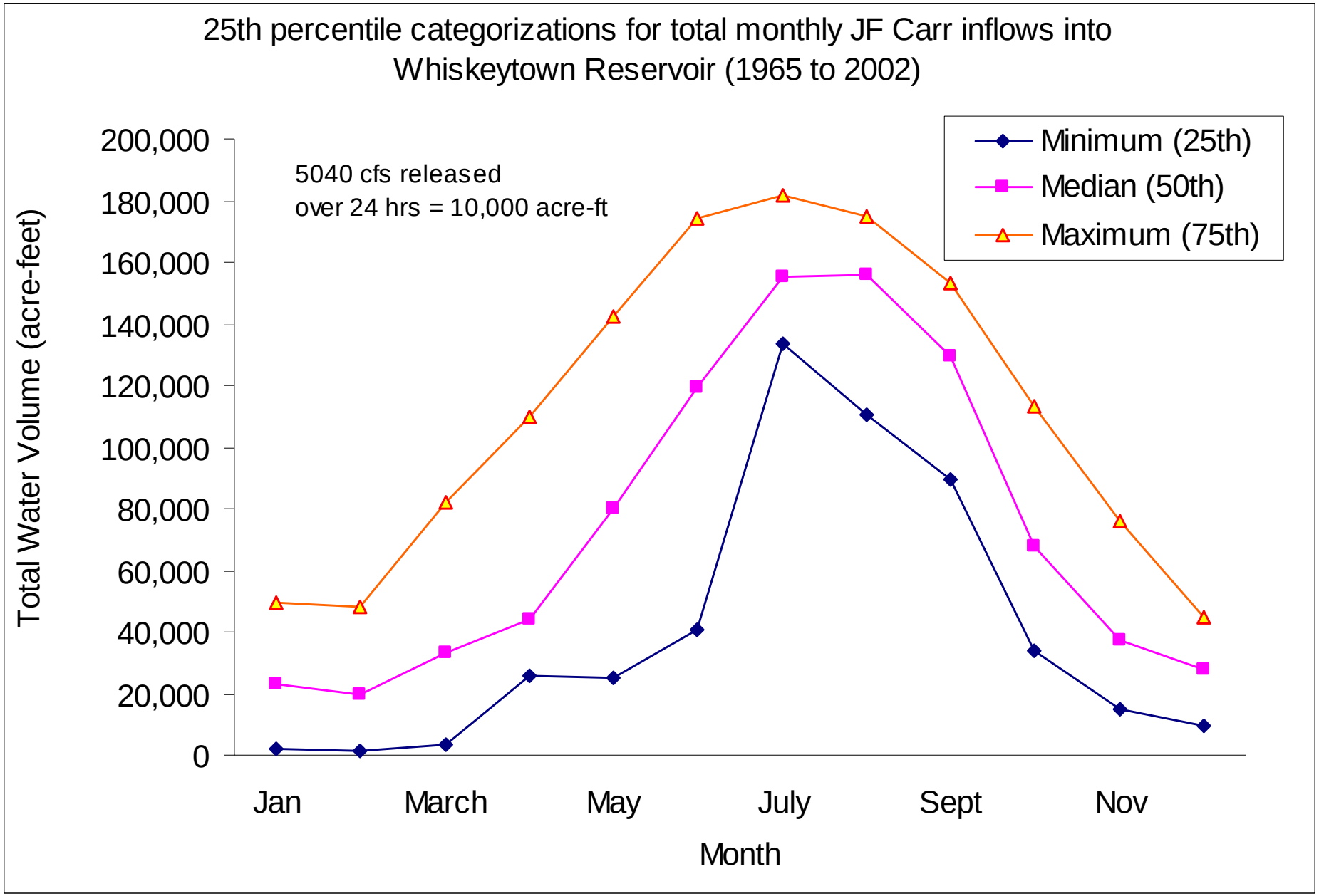

Figure 14b: Quartiles for total monthly inflow (under management control) from the Trinity river, through the JF Carr tunnel, 1965 to 2002.

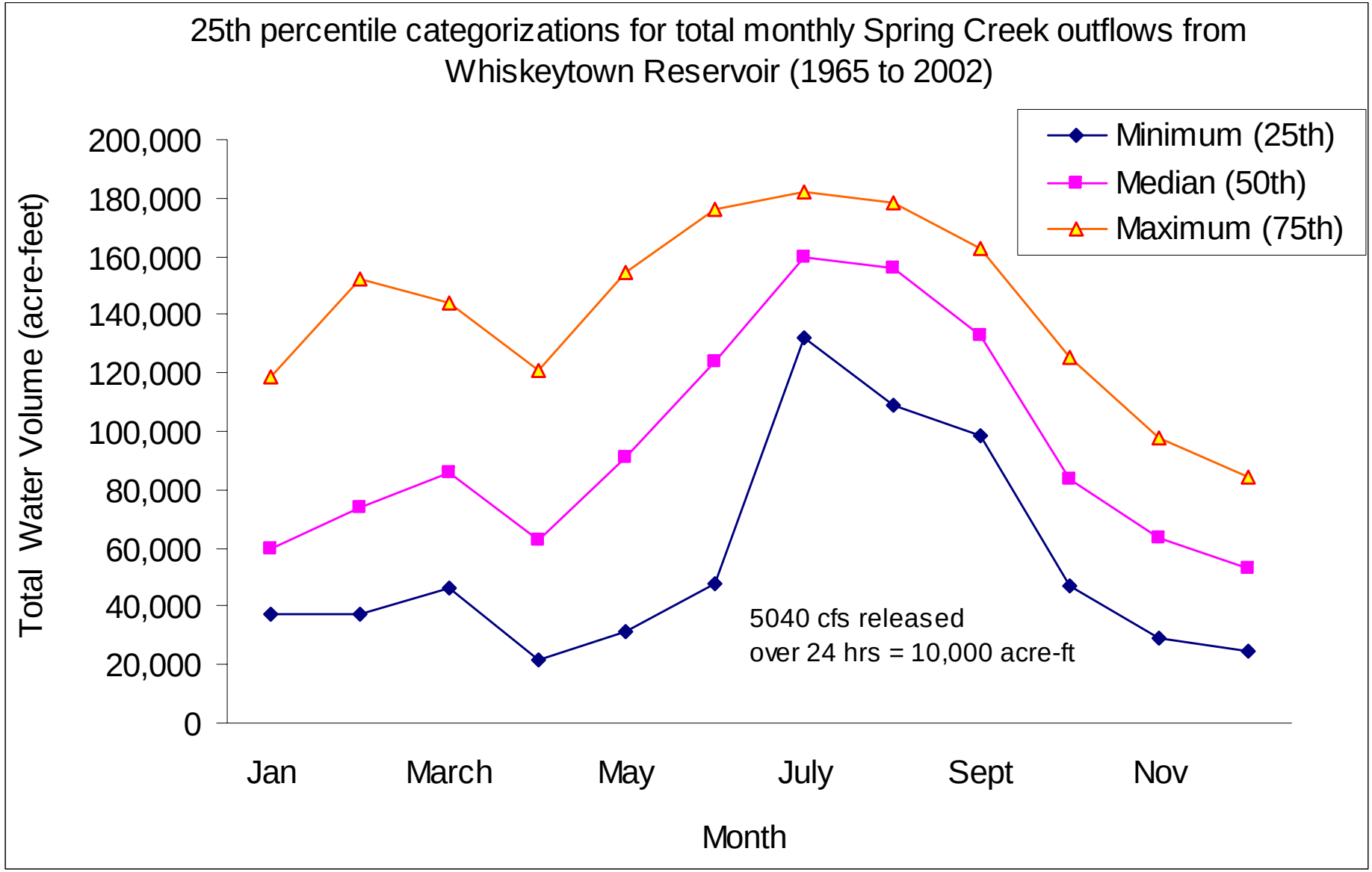

Figure 15a: Quartiles for the total monthly outflow through Spring Creek tunnel (under management control), 1965 to 2002.

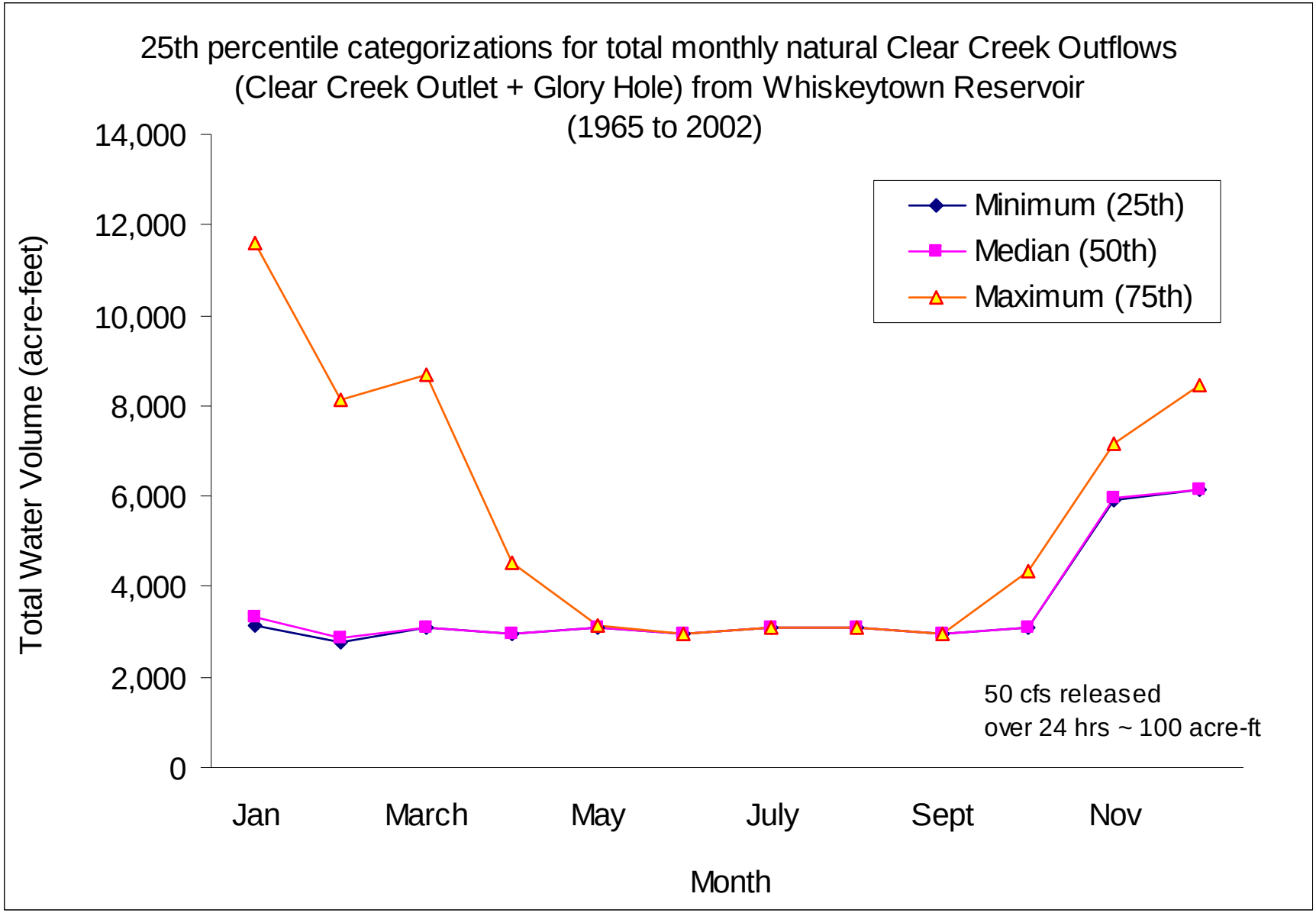

Figure 15b: Quartiles for the total monthly outflow to Clear Creek, 1965 to 2002.

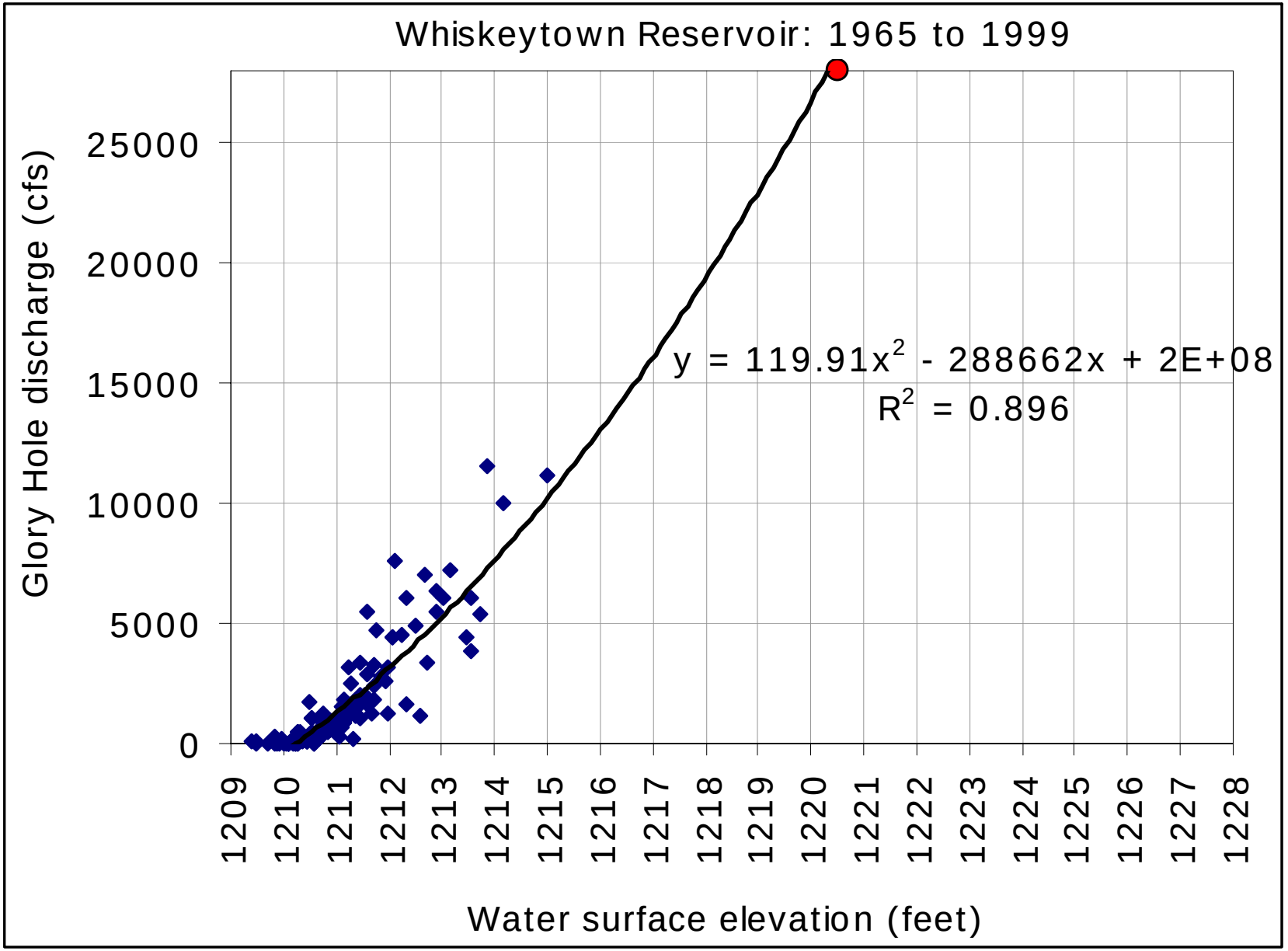

Figure 16: Historical Glory Hole discharge (cubic feet per second) as a function of Whiskeytown Reservoir water surface elevation (1965 to 1999). Red dot indicates the design maximum release (28,000 cfs) and the design elevation at which this flow would occur (this flow is not a part of the 1965 to 1999 record).